wrapping, and knotting; said fabric having a basis weight of between about 20 and 450 gm/m^2, having a machine direction elongation value of at least 75% and a cross direction value of at least 100%, having a fiber entanglement frequency of at least 10.0, a fiber entanglement completeness value of at least 1.00, a fiber interlock value of at least 15.

REMARKS

Responsive to the Official Action mailed February 12, 2002, applicants have further amended the claims of their application in an earnest effort to place this case in condition for allowance. Specifically, independent claims 1 and 13 have been amended. Reconsideration is respectfully requested.

Applicants wish to thank the Examiner, Ms. Torres Velazquez, for the courtesies extended to applicants' attorney during the telephone interview of June 14, 2002. During this interview, Ms. Torres Velazquez clarified that the outstanding Action was intended to include claims 12-13, and 45. Additionally, it was agreed that applicant would clarify the use of the term "substantially" which is believed to be used appropriately in the present case.

Additionally, during the telephonic interview, it was agreed that applicants would affirm the election of claims 1-13, responsive to the Examiner's previous restriction requirement (see Official Action mailed November 8, 2000). Election of these claims is hereby affirmed.

As further discussed during the above-referenced interview, independent claims 1 and 13 have been further amended to delete reference to "comprising", so it is clear that the recited nonwoven fabric "consists of" substantially endless melt-extruded

thermoplastic filaments. An essential aspect of the present invention is formation of a nonwoven fabric by hydroentanglement (sometimes referred to as spinlacing) of such extruded filaments in order to provide a fabric having unique characteristics.

In the Action, the Examiner rejected the pending claims under 35 U.S.C. §112. Specifically, the term "substantially" was objected to. This rejection is respectfully traversed. It is believed that the use of the term "substantially" fully complies with the requirements of §112, and that those skilled in the art, familiar with melt-extruded formation of these types of substantially continuous filaments, clearly understand the nature of such filaments. In distinction from fibrous material such as staple fibers, having discrete lengths such as ½ to 1-½ inch, the substantially endless continuous filaments employed in the fabric of the present invention are formed by melt-extrusion of polymeric material, with the filaments formed continuously from a spinerette assembly, a technique employed hereto for formation of so-called spunbond fabrics. As will be recognized by those familiar with the art, filaments formed in this fashion are essentially unbroken, and do not exhibit finite, discrete lengths, such as the case with staple fibers.

For formation of the present fabric, such substantially continuous filaments are collected, then subjected to hydroentanglement for forming the present fabric. While such filaments are essentially continuous in nature, it is recognized that there can be some discontinuity in some of the filaments, and thus it would be inaccurate to characterize the filaments as truly "endless". Obviously, formation of a fabric of discrete lengths, such as by cutting of the present fabric, cuts these filaments so that ends are formed, thus suggesting that the reference to such filaments as "substantially endless" is quite

appropriate. While applicant would be pleased to consider any alternative language which the Examiner may feel is appropriate, it is respectfully submitted that those skilled in the art are familiar with this type of filamentary material, and will clearly understand the nature of the fabric which is being claimed by the present terminology.

In rejecting the pending claims under 35 U.S.C. §102, the Examiner has relied upon U.S. Patent No. 4,808,467, to Suskind et al. This rejection is respectfully traversed.

As specifically noted by the Examiner, the Suskind et al. patent contemplates a fabric, such as for medical applications, which is produced by hydraulically entangling wood pulp fibers and textile staple-length fibers with a continuous filament base web. Thus, this patent clearly does not contemplate a nonwoven fabric which "consists of" substantially endless thermoplastic filaments. Rather, this patent specifically contemplates the integration of the wood pulp and the textile fibers with the continuous filament web, with the formation of a composite, multi-component fabric specifically contemplated. There is clearly no teaching or suggestion whatsoever in this reference of the formation of a fabric which in and of itself consists of continuous filament elements.

In the Action, the Examiner notes that Suskind et al. is silent with respect to the claimed interengaged packed loops, set forth in the claims of the present application. The absence of such discussion in Suskind et al. is not surprising, since this reference is understood to contemplate the use of the continuous filament web as a support or carrier for the wood pulp and textile fibers that are integrated therewith to form the contemplated composite fabric.

The formation of the recited interengaged packed loops by hydroentanglement of the recited substantially endless thermoplastic filaments provides a fabric structure which can be very efficiently formed, and which exhibits physical characteristics which are quite distinct from other types of fabric. It is first important to note that melt-extrusion of such filaments can be efficiently effected, with routine forming speeds as high as 1,000 meters per minute. The filaments can be drawn and quenched very quickly to get the desired crystalline alignment.

It is important to note an aspect of the present fabric which is distinct from hydroentangled fabrics comprising staple length fibers. Hydroentanglement of staple length fibers typically creates "knots" as the ends of the relatively short fibers are entangled under the influence of high-pressure water jets. When this type of fabric is subjected to an elongation force, these knots tend to tighten, and then fail.

In contrast, the hydroentangled filaments of the present fabric include "loops" (not fiber ends) which are "knotted" by hydroentanglement, with the fabric then tending to elongate, when subjected to force, by disentanglement of these loops. The fabric exhibits a distinctly different stress/strain curve than hydroentangled staple fiber fabrics. Thus, the present fabric permits the desired tensile strengths to be achieved, permitting lighter weight fabrics than those which are formed such as from staple fibers.

In comparison to typical spunbond fabrics comprising continuous filaments, it has been typically necessary heretofore to heat-bond such fabrics to achieve the desired fabric strength. However, the present fabric can provide the desired fabric strength without resort to the same degree of thermal bonding, which thermal bonding can significantly

inhibit efficient manufacture, since production lines cannot be run at speeds which are as high as those by which the melt-extruded filaments can be formed and collected. Additionally, the typical heat-bonding of spunbond fabrics is avoided, which can result in a fabric exhibiting a "crunchy" texture, which results from the heat-bonding. Heat-bonded regions (sometimes referred to as "windows") are similarly avoided by formation of the present hydroentangled filament fabric.

For the Examiner's information, applicants submit herewith a copy of a June 17, 2002 article from the News Observer discussing a facility which can form fabrics in accordance with the present invention.

In conclusion, allowance of claims 1-13 is believed to be in order and is respectfully solicited. Should the Examiner wish to speak with applicants' attorneys, they may be reached at the number indicated below.

Respectfully submitted,

By _____
Stephen D. Geimer, Reg. No. 28,846

WOOD, PHILLIPS, KATZ, CLARK & MORTIMER
Citicorp Center, Suite 3800
500 West Madison Street
Chicago, Illinois 60661-2511
312/876-1800

CERTIFICATE OF MAILING

I hereby certify that this paper is being deposited with the United States Postal Service with sufficient postage at First Class Mail in an envelope addressed to: Commissioner for Patents, Washington, D.C. 20231 on

_____

1. A nonwoven fabric consisting of substantially endless thermoplastic melt extruded filaments having a denier of 0.5 to 3, wherein said filaments are hydroentangled in the form of interengaged packed loops, with the filaments being free of breaking, wrapping and knotting, and wherein said hydroentangled web has a cross machine elongation value in excess of 100%.

12~~13~~. A nonwoven fabric consisting of substantially endless melt extruded thermoplastic filaments having a denier of about 1.0 to 2.5, wherein said filaments are hydroentangled in the form of interengaged packed loops, with the filaments being substantially free of breaking, wrapping, and knotting; said fabric having a basis weight of between about 20 and 450 gm/m^2, having a machine direction elongation value of at least 75% and a cross direction value of at least 100%, having a fiber entanglement frequency of at least 10.0, a fiber entanglement completeness value of at least 1.00, a fiber interlock value of at least 15.